
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: March 2014

Questions regarding this report should be directed to:

Michal Koller

California Department of Water Resources
Division of Environmental Services
3500 Industrial Blvd
West Sacramento, CA 95691

Telephone: (916) 376-9728
Michal.Koller@water.ca.gov

TABLE OF CONTENT

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT	2
2. MONITORING RESULTS.....	3
2.1 CHANNEL WATER SALINITY COMPLIANCE	3
2.2 DELTA OUTFLOW.....	3
2.3 PRECIPITATION.....	3
2.4 SUISUN MARSH SALINITY CONTROL GATES (SMSCG) OPERATIONS	4
3. DISCUSSION.....	4
3.1 FACTORS AFFECTING CHANNEL WATER SALINITY IN THE SUISUN MARSH	4
3.2 OBSERVATIONS AND TRENDS.....	4
3.2.1 <i>Conditions During the Reporting Period</i>	4
3.2.2 <i>Comparison of Reporting Period Conditions with Previous Years</i>	5
4. LIST OF FIGURES	
Figure 1: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Compliance Stations	
Figure 2: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Monitoring Stations	
Figure 3: Daily Net Delta Outflow Index and Precipitation	
Figure 4: Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations	
Figure 5: Suisun Marsh Stations	

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per the State Water Resources Control Board (SWRCB) Water Rights Decision 1641 (D-1641), dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

COMPLIANCE STATIONS:		
Station Identification	Station Name	General Location
C-2*	Collinsville	Western Delta
S-64	National Steel	Eastern Suisun Marsh
S-49	Beldon's Landing	North-Central Suisun Marsh
S-42	Volanti	North-Western Suisun Marsh
S-21	Sunrise	North-Western Suisun Marsh

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh:

MONITORING STATIONS:		
Station Identification	Station Name	General Location
S-97	Ibis	Western Suisun Marsh
S-35	Morrow Island	South-Western Suisun Marsh

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

2. MONITORING RESULTS

2.1 Channel Water Salinity Compliance

March 2014 was the third month in the deficiency period that started January 2014, and is forecasted as a Critical Water Year Type based on the California Cooperative Snow Surveys Forecast of April 1, 2014. A deficiency period is defined by D-1641 Table 3 footnote 6. During the month of March, salinity conditions at all five compliance stations were in compliance with channel water salinity standards (Table 1). Compliance with standards for the month was determined for each compliance station by comparing the progressive daily mean (PDM) of high tide SC with respective standards. The standard for March was 8.0 mS/cm for stations Collinsville (C-2), National Steel (S-64), Beldon's Landing (S-49), and the deficiency standard was 15.6 mS/cm for stations Sunrise Club (S-21) and Volanti (S-42). The progressive daily mean is the monthly average of both daily high tide SC values. The mathematical equation is shown below:

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days in the month}}$$

2.2 Delta Outflow

Outflow for March 2014 ranged between 4,500 cfs and 25,900 cfs (Figure 3). For the month, outflow began at 17,000 cfs and peaked at 25,900 cfs on March 3rd. Outflow then decreased but peaked again at 24,300 cfs on March 8th and again at 16,700 cfs on March 14th. Outflow decreased and stayed around 5,500 cfs before increasing again and ending the month at 14,000 cfs. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for March 2014 is listed below:

Month	Mean NDOI (cubic feet per second)
March	12,900

2.3 Precipitation

There were three series of major precipitation events in March 2014. The first began on March 1st and ended on March 6th. It amounted to 0.76 inch of precipitation. The

second major event occurred between March 25th and March 26th and produced 0.67 inch of precipitation. The last event occurred between March 29th and March 31st and totaled 1.2 inches of precipitation. March's historical average precipitation in Fairfield is 3.41 inches. The monthly total precipitation recorded at the Fairfield Water Treatment Plant is below:

Month	Total Precipitation (inches)
March	2.66

2.4 Suisun Marsh Salinity Control Gates Operations

Operations and flashboard/boat lock installations at the Suisun Marsh Salinity Control Gates (SMSCG) during March 2014 are summarized below:

Date	Gate Status	Flashboards Status	Boat Lock Status
March 1-31	3 Operational	In	Partially Closed

Due to salinity concerns, the gates were operated for the whole month of March.

3. DISCUSSION

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- Delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operations of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions During the Reporting Period

For March 2014, PDM salinity levels at compliance stations C-2, S-64, S-49, S-21 and S-42 are shown in Figure 1. Salinity levels for March started in the range of 3.72 mS/cm to 5.82 mS/cm and decreased due to the March 1st to March 6th precipitation event. Salinity increased slightly before stabilizing and ending the month between 2.02 mS/cm and 3.76 mS/cm.

Salinity levels at monitoring stations S-35 and S-97 are shown in Figure 2. Salinity for S-35 began the month of March at 8.97 mS/cm and decreased slightly in response to the first precipitation event of March. Salinity then increased to 9.1 mS/cm before gradually decreasing to end the month at 8.79 mS/cm. Salinity for S-97 started the month at 7.26 mS/cm and had an unexplained peak of 7.91 mS/cm on March 2nd before responding to the early March storm. Salinity gradually increased and ended the month at 7.94 mS/cm. Due to a sensor malfunction, data was not available for March 29th to March 31st.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high tide SC at the compliance and monitoring stations for March 2014 were compared with means for those months during the previous nine years (Figure 4).

March 2014 mean salinity pattern for all compliance and monitoring stations ranked 8th highest in salinity levels for the past 10 years. The years 2012 and 2013 ranked higher in salinity. 2012 was a below normal water year type and 2013 was a dry water year type. As expected, the salinity levels gradually increased from east to west with monitoring stations S-35 and S-97 having the highest salinity levels. These two stations are the furthest from the SMSCG and therefore may not benefit from SMSCG operations.

**Table 1: Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations
March 2014**

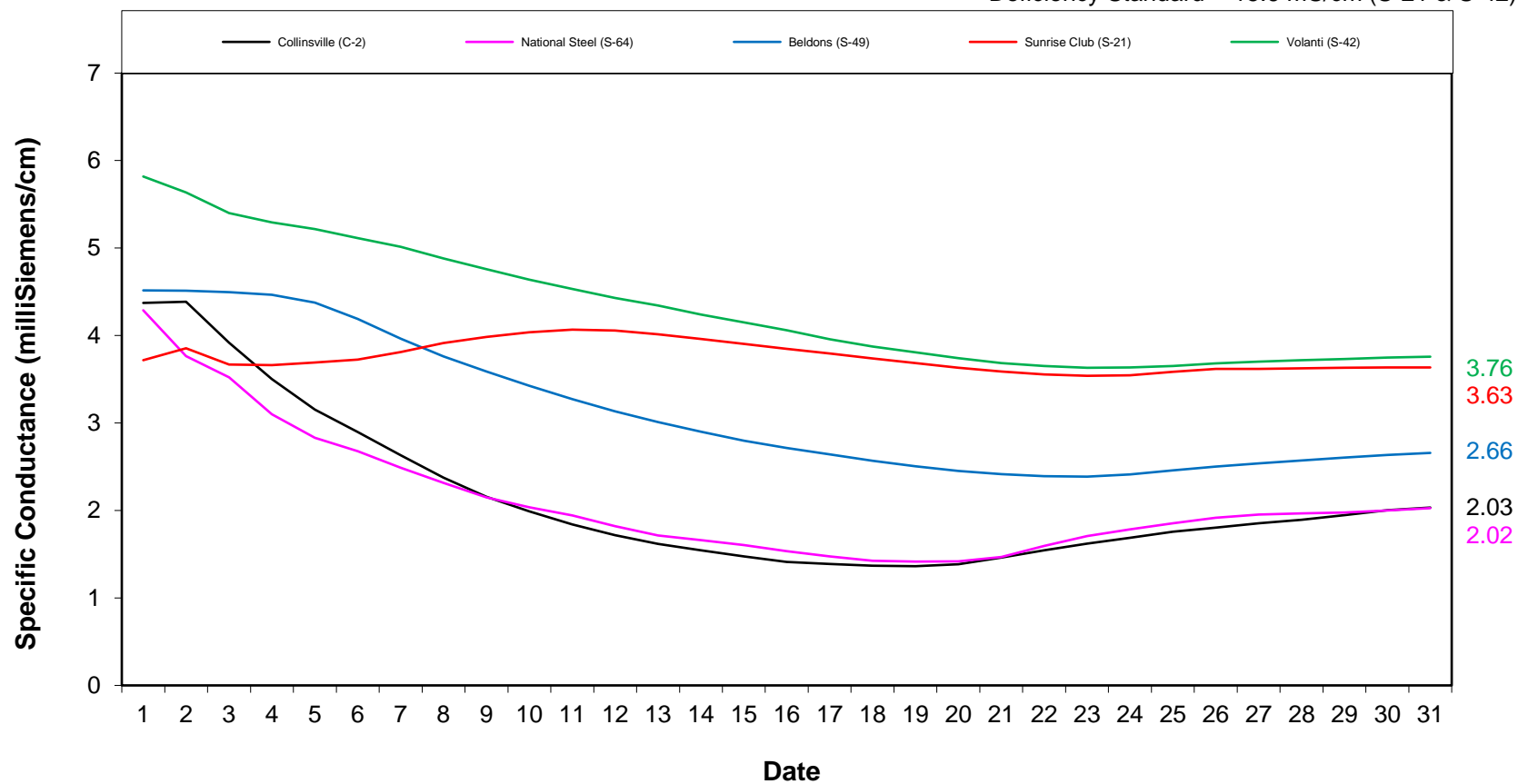
Station Identification	Specific Conductance (mS/cm)*	Normal Standard	Normal Standard Met?	Deficiency Standard	Deficiency Standard Met?
C-2**	2.03	8.0	Yes	N/A	N/A
S-64	2.02	8.0	Yes	N/A	N/A
S-49	2.66	8.0	Yes	N/A	N/A
S-42	3.76	N/A	N/A	15.6	Yes
S-21	3.63	N/A	N/A	15.6	Yes

*milliSiemens per centimeter

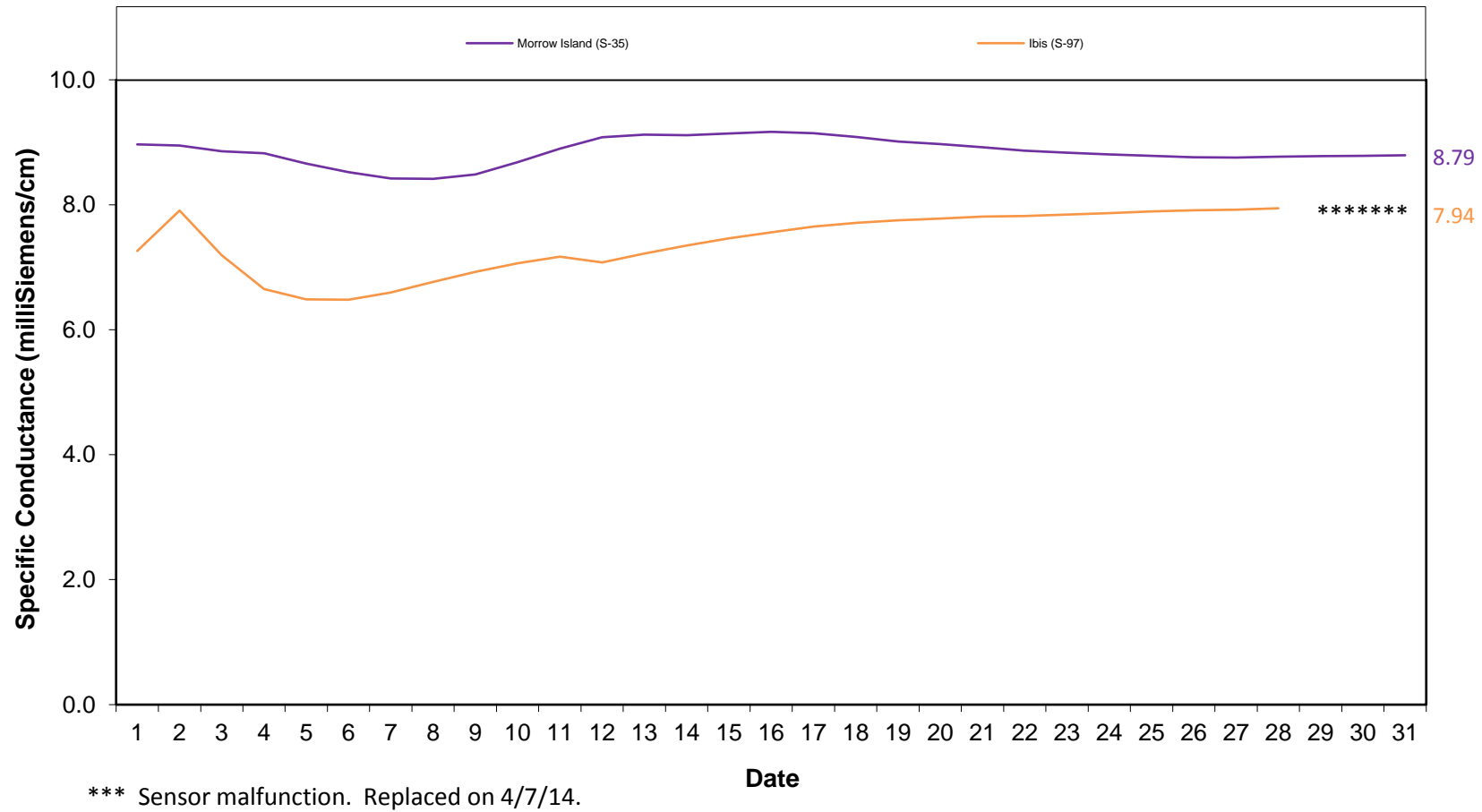
**The representative data from nearby USBR station is used in lieu of data from station C-2.

**Figure 1: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance
for Compliance Stations
March 2014**

Standard = 8.0 mS/cm
Deficiency Standard = 15.6 mS/cm (S-21 & S-42)

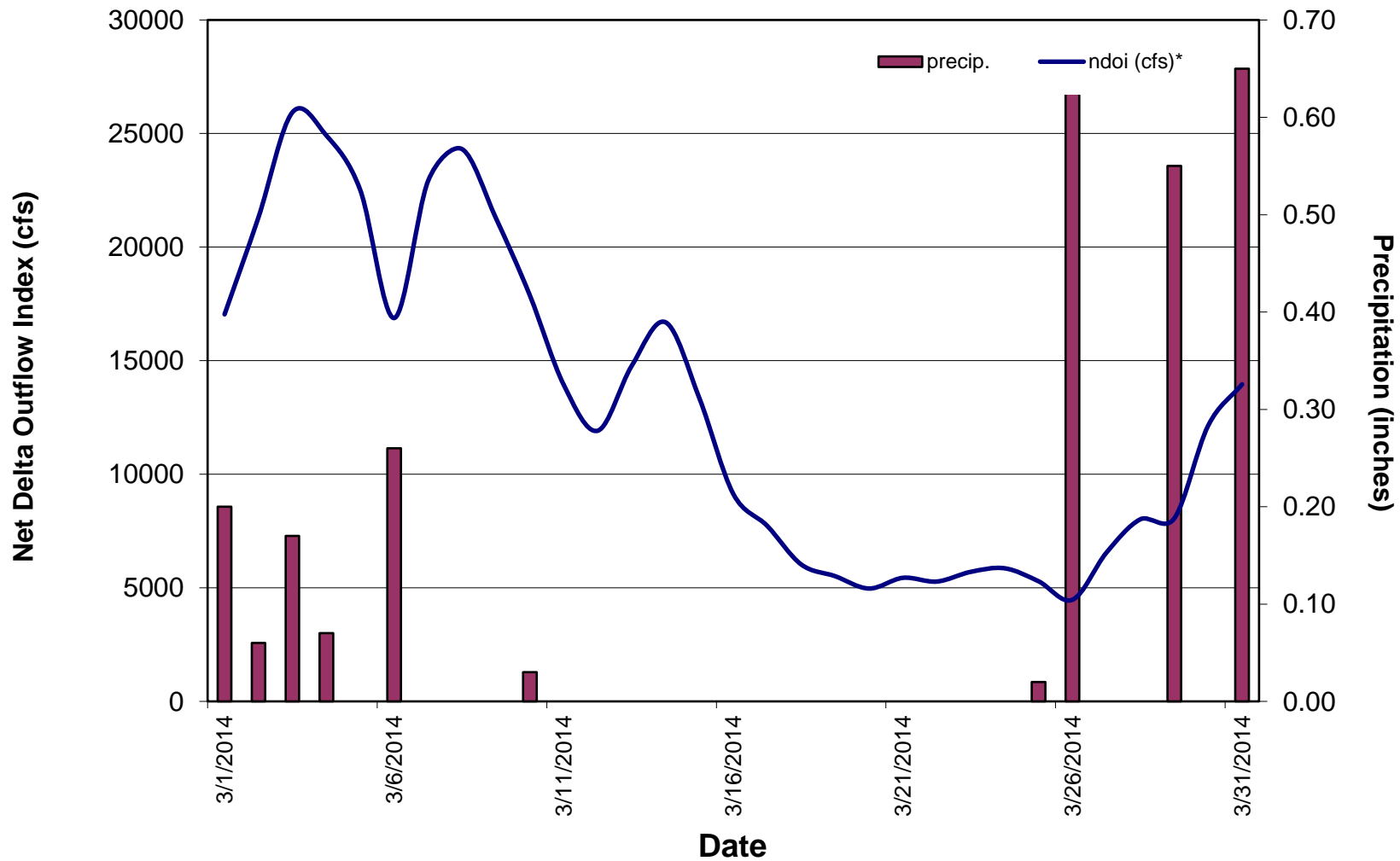


**Figure 2: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance
for Monitoring Stations
March 2014**

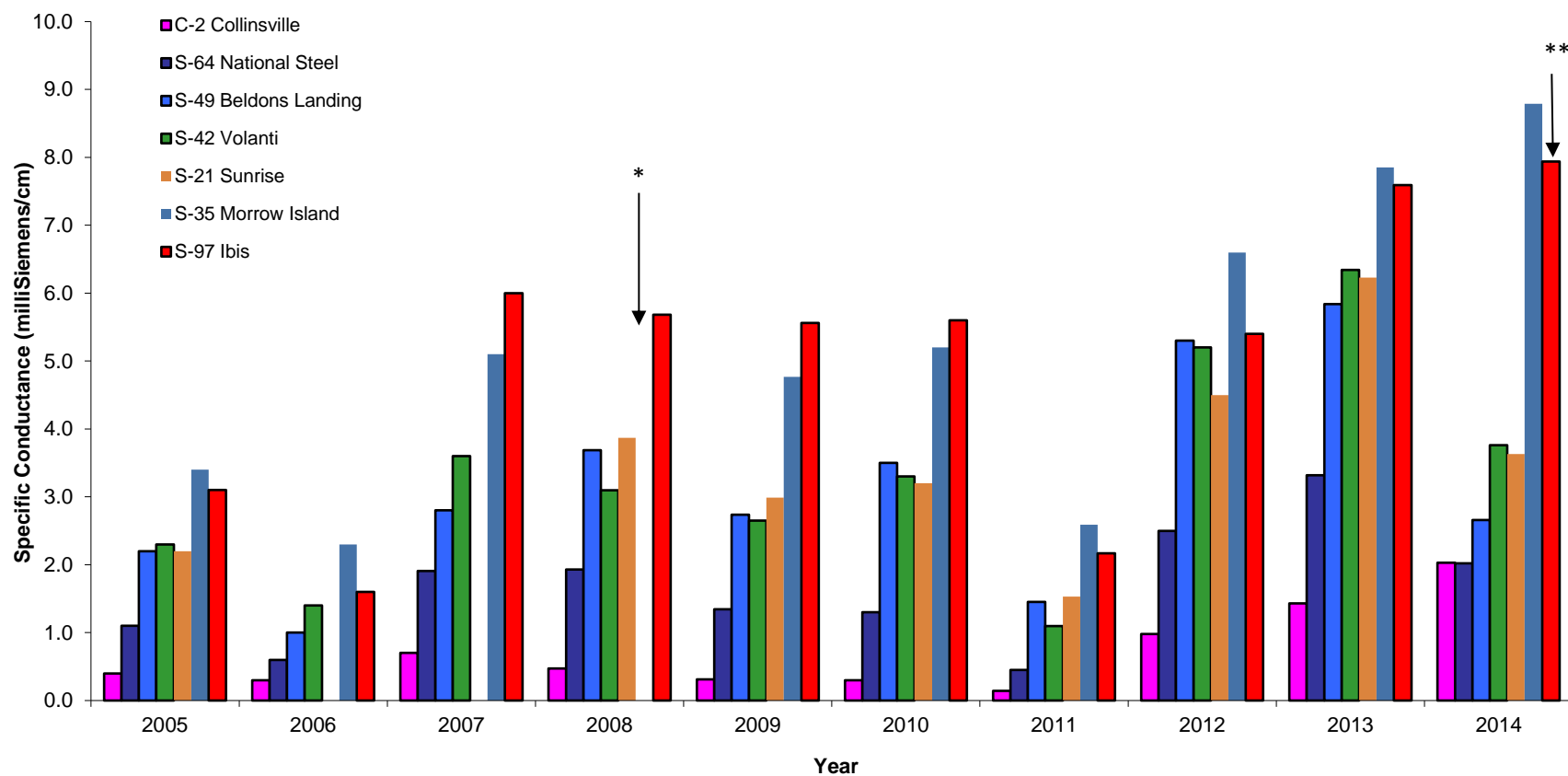


**Figure 3: Daily Net Delta Outflow Index and Precipitation
March 2014**

*Preliminary DWR, O&M data



**Figure 4. Monthly Mean Specific Conductance at High Tide:
Comparison of Monthly Values for Selected Stations
March of 2005-2014******



****2006 and 2007 data not available for S21 due to flooded roadways.

*Data not available for S35 due to equipment upgrade.

** Sensor malfunction 3/29/14-3/31/14.

Figure 5: Suisun Marsh Stations

- ★ Compliance
- ▲ Monitoring
- ◆ Blacklock
- Initial Facilities

0 1.25 2.5 5 Miles

